PSYC 3914 – Behavioural and Cognitive Neuroscience (Advanced)

Unit of Study Code: PSYC3014

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Consultation times: by appointment

Tutors: TBA- Your tutor will advise you of their consultation times in the first tutorial.

Format of Unit: 2 x 1 hour lectures/week x 13 weeks
1 x 2 hour tutorial/week x 10 weeks

Credit Point Value: 6 Credit Points

Prerequisite: 1. PSYC (2011 or 2911 or 2111) and at least one other Intermediate Psychology Unit from PSYC (2012 or 2112), PSYC (2013 or 2113), PSYC (2014 or 2114). OR
2. (PSYC2011 or 2911 or 2111 or 2013) and ANAT2010 and PCOL2011.
Assessment:

**Examination:** 50% of total mark: Half of the available marks from multiple-choice questions and half from short answer questions.

**Written Assignment:** One 2000-2500 word essay/report (35%) due before 4pm Friday 13 September (Week 7)

**Tutorial Quiz:** held in tutorial (Week 13) assessing the tutorial material not covered in the report (multiple choice) (10%)

**Presentation:** delivery of a presentation critically evaluating original research (5%)

Administrative matters:

*** Completion of all assessments is compulsory to pass the unit.

*** If you are unable to complete an assessment on time, you must apply for special consideration or late penalties will apply.  

*** You are expected to be available for the entire exam period. For students who cannot, for whatever reason, sit the exam on the scheduled date, you will need to apply to the Faculty for 'SPECIAL ARRANGEMENTS': http://sydney.edu.au/science/cstudent/ug/forms.shtml#special_arrangements

You should read the general administrative guidelines for submission of written work, penalties for late work, assessment criteria, procedures for applying for extensions and special consideration on the School of Psychology web page (http://www.psych.usyd.edu.au/current_students/psyc2_3/admin_guide/top10.shtml).

It is a requirement to pass the course that you attend a minimum of 80% of tutorials. It is your responsibility to attend the tutorial you are enrolled in and to be marked as present. Tutors will NOT contact another tutor to confirm your attendance if you do not attend your enrolled tutorial.

Textbook

This is the recommended text for the course. Most of you would have used it in PSYC2011 and the lecturers will refer to this text.


Some of you may also have the following if you took PSYC2011 prior to 2011 and it may also be a useful reference:


There are many other texts available that will touch on topics from the course. You are free to use these as additional sources but be aware that content in this field changes quickly and older texts can often contain inaccuracies.

Lectures may also provide references to other sources for you to study (e.g. research or review articles) where the most current research output may not be addressed in the textbook.
Unit of study general description:

This unit of study will focus on approaches to studying neurosciences incorporating molecular, preclinical and clinical models of brain function. These biological models of brain function will be linked with behavioural, affective and cognitive function and dysfunction. The implications of focal cognitive deficits in neurological patients for models of normal cognitive function will also be explored. Specific topics to be covered will be selected from the following areas: the biological basis of feeding and appetite, psychoneuroimmunology, glial cell function, the neural basis of learning and memory, sensorimotor integration, neurodegenerative disease, social neuroscience, language, visual cognition and praxis. In addition to lectures, a practical component will cover basic neuroanatomy and introduce students to experimental and case-study approaches to studying neurosciences.

Graduate Attributes in Behavioural and Cognitive Neuroscience

This course is structured around the graduate attributes associated with the scientist-practitioner model, the basis for the training of psychologists in Australia and internationally. Graduate Attributes are the generic skills, abilities and qualities that students should acquire during their university experience and the School of Psychology is committed to providing an environment to promote these skills. In addition, this unit of study will provide students with generalised and transferable skills that will also be useful in careers outside psychology.

The following graduate attributes and student learning outcomes will be developed through lectures, practical classes and assessment activities. They will be assessed in the laboratory report, tutorial quiz, class debate and final exam.

1: Knowledge and Understanding of behavioural neuroscience and cognitive neuroscience

Display basic knowledge and understanding of major concepts, theoretical perspectives, empirical findings, and historical trends in behavioural and cognitive neuroscience

Student learning outcomes:
(i) An interest in and appreciation of the historical and current contribution of learning theorists, neuroscientists, psychopharmacologists, cognitive and sensory scientists to the understanding of the brain and behaviour and to the treatment of mental illness and neurological disorders.
(ii) Understanding basic neural processes and anatomical systems underlying different types of learning and memory.
(iii) Understanding the neural control of movement and its disorders
(iv) Understanding the clinical presentation and biological bases of dementia
(v) Understanding neural systems underlying speech and language and its disorders
(vi) Understanding of concepts of neural computation
(vii) Understanding neural correlates of sleep and wakefulness
(viii) Ability to describe, explain and evaluate research studies in these fields.
(ix) Skill in reporting experimental work using standard conventions.

2: Research Methods in behavioural and cognitive neuroscience

Understand, apply and evaluate basic research methods in behavioural and cognitive neuroscience, including design of laboratory and clinical research, data collection, analysis and interpretation, literature searches and review. Demonstrate understanding of technologies used to study brain function and activity.

Student learning outcomes:
(i) To develop a critical understanding of the major methods of research in these areas.
(ii) To critically assess the major theories and research findings in these areas.
(iii) To interpret statistical analyses.
(iv) Use basic web-search, word-processing, database, email, spreadsheet, and data analysis programs.
(v) Design and conduct basic studies to address psychological questions: frame research questions; undertake literature searches; critically analyse theoretical and empirical studies; formulate testable hypotheses; operationalise variables; choose an appropriate methodology; make valid and reliable measurements; analyse data and interpret results; and write research reports.

3: Critical Thinking Skills in behavioural and cognitive neuroscience
Respect and use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to the neuroscientific bases of behaviour. Develop ability to identify and evaluate the purposes, research questions, data, perspectives, inferences, concepts, implications and assumptions associated with research presented during the course.

**Student learning outcomes:**
(i) Demonstrate an attitude of critical thinking that includes persistence, open-mindedness, and intellectual engagement.
(ii) Evaluate the quality of information, including differentiating empirical evidence from speculation.
(iii) Evaluate issues and behaviour using different theoretical and methodological approaches.
(iv) Use reasoning and evidence to recognise, develop, defend, and criticise arguments and persuasive appeals.

### 4: Values in behavioural and cognitive neuroscience

**Student learning outcomes:**
(i) Value empirical evidence; tolerate ambiguity during the search for greater understanding of behaviour and knowledge structures
(ii) Use information in an ethical manner (e.g., acknowledge and respect the work and intellectual property rights of others through appropriate citations in oral and written communication)
(iii) Be able to recognise and promote ethical practice in research.
(iv) Promote evidence-based approaches and rigour in the understanding of behaviour.
(v) Be aware of ethical issues pertaining to clinical interventions.
(iv) Respect diversity associated with cognitive and neurological disorder

### 5: Communication Skills in behavioural and cognitive neuroscience

**Student learning outcomes:**
(i) Write a standard research report using American Psychological Association (APA) structure and formatting conventions.
(ii) Write effectively in a variety of other formats (e.g., essays, research proposals, reports) and for a variety of purposes (e.g., informing, arguing).
(iii) Demonstrate effective oral communication skills in various formats (e.g., debate, group discussion, presentation) and for various purposes.
(iv) Collaborate effectively, demonstrating an ability to: work with groups to complete projects within reasonable timeframes; manage conflicts appropriately and ethically.

### 6: Learning and the application of behavioural and cognitive neuroscience

**Student learning outcomes:**
(i) To develop an awareness of the applications of the theories and research findings in learning, control of movement, memory, language, visual processing, computational modeling and sleep.
(ii) Apply psychological concepts, theories, and research findings to solve problems in everyday life and in society.
(iii) Understand major areas of applied psychology and neuroscience.
(iv) Understand how basic research in psychopharmacology and neuroscience gives rise to treatments for addictions, movement and memory disorders and other neurological disorders.
(v) Develop a capacity for independent learning that will sustain personal and professional development in the rapidly changing field of neuroscience
(iv) Self-assess performance accurately; incorporate feedback for improved performance; purposefully evaluate the quality of one’s thinking (metacognition, part of critical thinking).
Evidence of learning:

Graduate attribute 1: Core knowledge and understanding.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal psychology</td>
<td>mc and sa exam</td>
</tr>
<tr>
<td>Biological bases of behaviour</td>
<td>2,500 word report, quiz, presentations, mc and sa exam</td>
</tr>
<tr>
<td>Cognition, information processing and language</td>
<td>2,500 word report, quiz, presentations, mc and sa exam</td>
</tr>
<tr>
<td>Learning</td>
<td>2,500 word report, quiz, mc and sa exam</td>
</tr>
<tr>
<td>Motivation and emotion</td>
<td>2,500 word report, quiz, mc and sa exam</td>
</tr>
</tbody>
</table>

Graduate attribute 2: Research methods in psychology.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe, apply and evaluate the different research methods used by psychologists</td>
<td>2,500 word report</td>
</tr>
<tr>
<td>Design and conduct basic studies to address psychological questions: frame research questions; undertake literature searches; critically analyse theoretical and empirical studies; formulate testable hypotheses; operationalise variables; choose an appropriate methodology; make valid and reliable measurements; analyse data and interpret results; and write research reports</td>
<td>2,500 word report</td>
</tr>
</tbody>
</table>

Graduate attribute 3: Critical thinking skills.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>apply knowledge of the scientific method in thinking about problems related to behaviour and mental processes</td>
<td>2,500 word report, quiz</td>
</tr>
<tr>
<td>Recognise and defend against the major fallacies of human thinking</td>
<td>presentation</td>
</tr>
</tbody>
</table>

Graduate attribute 4: Values, research and professional ethics.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use information in an ethical manner (e.g., acknowledge and respect work and intellectual property rights of others through appropriate citations in oral and written communication)</td>
<td>All essays, reports, presentations.</td>
</tr>
</tbody>
</table>
### Graduate attribute 5: Communication skills.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate effective oral communication skills in various formats (e.g., debate, group discussion, presentation) and for various purposes</td>
<td>presentation</td>
</tr>
</tbody>
</table>

### Graduate attribute 6: Learning and application of psychology.

<table>
<thead>
<tr>
<th>Topic in years 1 to 3</th>
<th>Form/s of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate a capacity for independent learning to sustain personal and professional development in the changing world of the science and practice of psychology</td>
<td>All assessments except group exercises</td>
</tr>
</tbody>
</table>
**LECTURE AND TUTORIAL TIMETABLE**

Lectures are held on Mondays at 11am in *Bosch Lecture Theatre 4* and Thursdays at 11am in *Bosch Lecture Theatre 1*

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture #</th>
<th>Topic</th>
<th>Lecturer</th>
<th>Tutorial (2 hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 July</td>
<td>1</td>
<td>A history of the neurosciences</td>
<td>LC</td>
<td>No tutorial</td>
</tr>
<tr>
<td>Week 1</td>
<td>2</td>
<td>Long term potentiation</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>05 Aug</td>
<td>3</td>
<td>Neural bases of Pavlovian conditioning</td>
<td>LC</td>
<td>Neuroanatomy</td>
</tr>
<tr>
<td>Week 2</td>
<td>4</td>
<td>Motivation</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>112 Aug</td>
<td>5</td>
<td>Goal-directed Learning</td>
<td>LC</td>
<td>Behavioural Neuroscience</td>
</tr>
<tr>
<td>Week 3</td>
<td>6</td>
<td>Habit Learning</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>19 Aug</td>
<td>7</td>
<td>Movement and motor control I</td>
<td>JH</td>
<td>Behavioural Neuroscience</td>
</tr>
<tr>
<td>Week 4</td>
<td>8</td>
<td>Movement and motor control II</td>
<td>JH</td>
<td>II: Training &amp; Testing</td>
</tr>
<tr>
<td>26 Aug</td>
<td>9</td>
<td>Biological Bases of Dementias</td>
<td>JH</td>
<td>Behavioural Neuroscience</td>
</tr>
<tr>
<td>Week 5</td>
<td>10</td>
<td>Dementia: Clinical Syndromes</td>
<td>IH</td>
<td>III: Pharmacological</td>
</tr>
<tr>
<td>02 Sep</td>
<td>11</td>
<td>Episodic Memory</td>
<td>IH</td>
<td>Behavioural Neuroscience</td>
</tr>
<tr>
<td>Week 6</td>
<td>12</td>
<td>Semantic Memory</td>
<td>KC</td>
<td>IV: Histology</td>
</tr>
<tr>
<td>09 Sept</td>
<td>13</td>
<td>Lexical retrieval and anomia</td>
<td>KC</td>
<td>No tutorial: finalize your report</td>
</tr>
<tr>
<td>Week 7</td>
<td>14</td>
<td>Speech Motor Control</td>
<td>KC</td>
<td></td>
</tr>
<tr>
<td>16 Sep</td>
<td>15</td>
<td>Acquired Speech and Language impairments</td>
<td>KC</td>
<td>Clinical Research Methods I</td>
</tr>
<tr>
<td>Week 8</td>
<td>16</td>
<td>Recovery from Aphasia</td>
<td>KC</td>
<td></td>
</tr>
<tr>
<td>23 Sept</td>
<td>17</td>
<td>High Level Visual Processing I</td>
<td>IH</td>
<td>Clinical Research Methods II</td>
</tr>
<tr>
<td>Week 9</td>
<td>18</td>
<td>High Level Visual Processing II</td>
<td>IH</td>
<td></td>
</tr>
<tr>
<td>30 Sep</td>
<td>-</td>
<td>Study Break</td>
<td></td>
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<tr>
<td>Week 10</td>
<td>19</td>
<td>Visual Recognition Disorders</td>
<td>IH</td>
<td>No tutorials</td>
</tr>
<tr>
<td>Week 11</td>
<td>21</td>
<td>Brains vs. Computers II</td>
<td>AH</td>
<td></td>
</tr>
<tr>
<td>Week 12</td>
<td>23</td>
<td>Attention and the parietal lobe II</td>
<td>AH</td>
<td></td>
</tr>
<tr>
<td>28 Oct</td>
<td>24</td>
<td>Sleep</td>
<td>LC</td>
<td>Lab Visit</td>
</tr>
<tr>
<td>Week 13</td>
<td>25</td>
<td>Biological Rhythms</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>4 Nov</td>
<td>-</td>
<td>Study Break</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>Week 14</td>
<td>11</td>
<td>Exam Period</td>
<td></td>
<td>No classes</td>
</tr>
<tr>
<td>18 Nov</td>
<td>-</td>
<td>Exam Period</td>
<td></td>
<td>No classes</td>
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<tr>
<td>Week 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Nov</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>Week 16</td>
<td></td>
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</tbody>
</table>

LC = Laura Corbit, JH = Justin Harris, KC= Karen Croot, AH = Alex Holcombe, IH = Irina Harris

**Neuroanatomy Tutorials – Week 2**

Tutorials for WEEK 2 ONLY will be held in the Department of Anatomy, Anderson Stuart Building

Please plan to attend one of the following sessions:

- Monday 9-11
- Wednesday 9-11
- Thursday 9-11
THIS REPLACES YOUR NORMAL TUTORIAL FOR WEEK 2 ONLY
• Do not go to your regular tutorial this week
• Please go on your normal day if possible
• From Week 3 on go to your assigned tutorial (usual lab OTC325)

Academic Dishonesty and Plagiarism
1. It is your responsibility to know what academic dishonesty and plagiarism are.

   Here is the link to the University’s policy:


2. Note that:

   i) the School of Psychology will penalise all submitted work that is plagiarised.

   ii) Students should note that all assignments (including group projects) will be run through similarity detecting software. This software detects similarities between (a) your assignment and both print and online sources, and (b) assignments submitted by other students, from both current and previous years. If similarities are found, they will be investigated so as to determine the nature of the plagiarism. See Part 5 of the University's policy.

Avoiding plagiarism – key points
• Plagiarism is a serious offence and may result in failure in the course. Even where students are completing an exercise together, each student must submit separate written work. Incorporation of any material from another student’s assignment is regarded as plagiarism.

• In writing essays or reports to meet coursework requirements, you should use your own words. In some contexts (e.g., theoretical research) it is appropriate to use an occasional quotation. This should be indicated in the conventional way by enclosing the passage within quotation marks and by providing a precise (page number) reference for the source of the quote. In many contexts, especially reports of empirical work, quotations are best avoided.

• “Using your own words” means that you should not borrow from the writing of others – whether from fellow students or published authors. For example, it is not acceptable to base an essay on text from various sources that you have then edited to some degree – even if you cite these sources. First of all, there is the ethical issue arising from the dishonesty of presenting as your own work something which is essentially the work of others. In addition, there are good educational reasons for avoiding this, even where you feel that someone else has expressed some idea far more clearly than you could. One reason is that you must learn to express yourself clearly in writing; like most other skills, this only comes with practice. Another, is the failure to understand information or ideas at all thoroughly if all you have done is reproduce (with some editing) what someone else has written about the topic.

• When you express in your own words what you have learned from various sources, you should cite each source. The standard convention for most written work in psychology is to list references at the end of your essay or report, rather than, for example, to use footnotes. To express some idea without giving a citation implies

• University of Sydney – Syllabus of Senior Psychology 3, 2012 page 6that it is your own idea. Therefore, if it is in fact an idea obtained from someone else, this needs to be acknowledged. Listing a set of sources implies that you have read them all. Therefore, you should list as references only those you have actually read. If you are depending on a secondary source, then make this clear, e.g., ... salivary conditioning (Pavlov, 1927; cited in Mazur, 1998).

• The points made here also apply to non-textual material. For example, graphs or tables of data included in a report should be your own work and not copied from others. Very occasionally you may need to ‘quote’ a figure from some other source; if you do so, you should make its origin quite clear.

• In general, avoid letting other students use your work for any kind of assessment. On the rare
occasion where this may be appropriate, make sure that the other student acknowledges your contribution as the original author.

- In some cultures, students show their respect for a teacher by copying what the teacher has said or written. In Australian University education, copying a teacher (even if paraphrasing) is plagiarism if the source is not cited.

### Frequently Asked Questions

1. **I don’t have access to Blackboard**

   Access to Blackboard is contingent on you being enrolled. If you enrolled late, there will be a delay in mapping you to Blackboard. For any questions, contact ICT helpdesk during semester by phone on 9351 6000 or by email on ict.support@sydney.edu.au (or psychology.info@sydney.edu.au if it is outside of the semester periods)

2. **What are the important dates for adding/dropping Units of Study?**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last day to ADD a unit a unit of study</td>
<td>Friday 9 August 2013</td>
</tr>
<tr>
<td>Last day to WITHDRAW from a unit of study</td>
<td>Saturday 31 August 2013</td>
</tr>
<tr>
<td>Last day to discontinue without failure (DNF)</td>
<td>Friday 13 September 2013</td>
</tr>
<tr>
<td>Last day to discontinue (discontinue – Fail)</td>
<td>Friday 1 November 2013</td>
</tr>
</tbody>
</table>

3. **I want to swap my tutorial time**

   There is currently only one tutorial for PSYC3914 and so it is not possible to swap to another tutorial time. If you are unable to attend this tutorial, you should consider enrolling in PSYC3014.

4. **Do I need to buy the textbooks?**

   - The lecturers will refer to textbooks and other references, which will provide a useful source for additional explanation and elaboration of topics discussed in lectures and tutorials and maybe examinable (you will be told in class whether or not textbook material and other references are examinable). You can choose to buy the textbook if you wish. The library has copies of the textbook both in Undergraduate Loans and in Special Reserve.